"NRCS Technology News" ~ May 2002

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Science and Technology

"NRCS *Technology News*" is a monthly electronic information piece provided by Science and Technology. It is designed to deliver pertinent information to our customers about new technology, products, and services available from the Soil Survey and Resource Assessment and the Science and Technology deputy areas. **"NRCS *Technology News*"** is in a format that is available to all NRCS field staff.

Features in this issue include:

MESSAGE FROM THE DEPUTY CHIEFS
Lawrence E. Clark and Maurice J. Mausbach

Think back over your lifetime—20, 30, or 40 years ago—and picture some of your favorite vistas—a city skyline, big skies over the Midwest, a mountain range, or perhaps a desertscape. For some of these mental images the air was clearer 30 years ago; for some the air is clearer now. Remembering the winters of our youth, many will describe snow-laden, blustery winters. "What has happened to winter?" our children may ask. With heightened awareness of the quality of the air we breathe and the vistas we cherish—and frequent reference to changes in temperatures—"air quality" and "global change" are phrases we hear and read about nearly every day.

NRCS customers across the country are joining efforts to mitigate emissions from agriculture where possible and where we have the science and technology to help them. They are working toward controlling odor, particulates, and greenhouse gases. These same customers are developing their role in slowing climate change through carbon sequestration and production of materials for bio-based fuels.

The President's Global Change Initiative mentions incentives for development and use of alternative and bio-based fuels and for vehicles able to use these fuels and different types of batteries. He asks for carbon sequestration and improved technology, requesting that the USDA work toward these ends. In addition, the Farm Bill, while not yet signed, mentions air quality in its various versions, especially in programs such as EQIP where it previously was not mentioned. There is reference to registration of greenhouse gas emissions, carbon credits, and funding for innovative research.

The Agricultural Air Quality Task Force, chaired by the Chief of NRCS, continues to provide recommendations to the Secretary of Agriculture regarding priorities for air quality and agricultural emissions research. The task force is a progressive group, made up of academics, industry representatives, producers, and health and regulatory professionals. It wants to ensure that both regulations and conservation practices are based on sound science, so that farmers are treated fairly and have good tools to control or mitigate emissions.

The task force was legislated by Congress in the 1996 Farm Bill to oversee and review research in agricultural air quality issues. Its purpose is to ensure intergovernmental cooperation in research activities and to make recommendations to the Secretary of Agriculture regarding research priorities and activities. Congress directed the formation of this task force because they learned that a number of studies found that agriculture is an alleged source of PM-10 emission and, then, that many of those studies were based on erroneous data. In addition, USDA was conducting several Federal research activities to determine to what extent agricultural activities contribute to air pollution and to identify cost-effective ways for agricultural industry to reduce air pollution. Congress wanted to ensure that policy recommendations issued by any Federal agency to address air pollution problems, related to agriculture or industrial activity, will be based on sound scientific findings that are subject to adequate peer review and that take economic feasibility into account.

This is an exciting time for NRCS – a time for potential growth and new direction. We have customers in the Environmental Protection Agency-designated, non-attainment areas (with respect to the Clean Air Act) who have been and will continue to be looking to us to provide technical and financial assistance. At this time, we have a small core of personnel at NRCS that support the development and transfer of technology for improved air quality. Please feel free to contact them through channels about this important work.

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CONSERVATIONIST'S CORNER
Kalven L. Trice, State Conservationist, Arkansas

In the early 1900s, settlers of the Grand Prairie, located southeast of Little Rock, Arkansas, between the White and Arkansas Rivers, discovered a wonderful combination of resources. The fertile silt soils, the gently sloping topography, and the abundant water of the alluvial aquifer are the perfect combination to grow a savory, highly nutritious, and what was then a little-known food in Arkansas. RICE had its start. In addition, the mild, wet winters attracted the largest concentration of mallard ducks in the United States. Today, Arkansas farmers produce approximately 40 percent of the Nation's rice crop. The Grand Prairie is a major rice and soybean-producing area of the State and provides winter habitat for ducks, geese, shore birds, and other waterfowl. Stuttgart, located near the geographic center of the Grand Prairie, is known as the "Rice and Duck Capitol of the World."

By the early 1990s, water in the alluvial aquifer declined to critical levels, many wells failed, and public support for a solution increased. A group of concerned landowners requested through Congress that the U.S. Army Corps of Engineers (Corps) develop a plan to protect the aquifer, provide a reliable and sustainable alternate water source, and improve fish and wildlife habitat. The Corps requested the Natural Resources Conservation Service (NRCS) assist in the development of this plan. The plan includes using water from the alluvial aquifer at a rate that would allow natural recharge, capturing runoff, increasing on-farm storage, improving on-farm irrigation efficiencies, and providing excess water from the White River. This $319 million plan will provide for the continued irrigation of approximately 238,000 acres of cropland and the flooding of approximately 38,000 acres of cropland for waterfowl in the winter. The on-farm portion of the plan calls for the installation of approximately $66 million of Federal cost-share conservation and water management practices at a 65 percent cost-share rate.

NRCS Arkansas formed an irrigation team to provide planning and installation assistance in the development of on-farm water management plans. This team provided guidance and direction to the Corps, the Arkansas Soil and Water Conservation Commission, and numerous Federal, State, and local organizations to address the agricultural water supply in the Grand Prairie. An environmental team was formed to coordinate work with environmental agencies, including the Arkansas Game and Fish and Natural Heritage commissions and the U.S. Fish and Wildlife Service. The NRCS National Water Management Center provided technical support by appointing an aquatic biologist to the

environmental team and detailing an irrigation engineer to the irrigation team. In addition, the Plant Materials Center at Booneville worked with the irrigation team on a demonstration project to explore the feasibility of using local native prairie grasses as a vegetative cover for embankments.

In September 2000, NRCS was notified that the Corps would be transferring approximately $25 million in cost-share funds to be obligated during fiscal year 2001 for on-farm conservation projects. The irrigation team developed automated surveying, mapping, planning and design procedures, and specifications for on-farm water management plans as a part of an overall project plan. By September 2001, the irrigation team developed 228 water management plans with signed contracts for $34 million of on-farm conservation practices. Additionally, approximately $5 million of construction of on-farm conservation practices was completed. The technology developed by the irrigation team is being transferred and adapted to other areas throughout the state.

As a result of these time and laborsaving procedures, NRCS Arkansas purchased a survey grade Global Positioning System and mapping/design software for each area of the state. NRCS Arkansas made a leap forward in the use of technology. Lessons learned from this project will help in the implementation of Farm Bill programs. It is imperative we stay on the cutting edge of technology to maintain and enhance the Nation's natural resources and provide the services our customers deserve.

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NEW PRODUCTS AND SERVICES

#1 Farm Bill Contributions to Wildlife Conservation Summarized in Recent Report

"A Comprehensive Review of Farm Bill Contributions to Wildlife Conservation 1985-2000" summarizes a review of the scientific literature that documents wildlife responses to programs established under the conservation title of the 1985 Food Security Act, as amended in 1990 and 1996 (Farm Bill). This report finds that positive wildlife response was evident when the needs of wildlife were considered in conservation planning and implementation.

Literature was annotated and summaries of wildlife responses were provided for the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Wildlife Habitat Incentives Program (WHIP), and environmental Quality Incentives Program (EQUIP). The report, edited by Wildlife Habitat Management Institute, was developed collaboratively by NRCS and its partners. It is available at http://www.ms.nrcs.usda.gov/whmi.
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#2 Index of Biotic Integrity Case Study Released

The Index of Biotic Integrity (IBI) is an integrative biological assessment approach that uses species assemblages to assess the cumulative impact of human influences on a stream, watershed, or ecosystem. Well documented and widely used, the IBI combines multiple metrics with appropriate sampling design and statistical analysis to evaluate an ecosystem's ability to support undisturbed living systems. The technique is currently in use by many State agencies to identify problem ecosystems or watersheds and to measure the effects of remedial measures that are designed to solve the problems.

An example of the application of the IBI for a small watershed is provided by NRCS Technical Note 190-13-1, "Using a Regional Index of Biotic Integrity (IBI) to Characterize the Condition of Northern Virginia Streams, with Emphasis on the Occoquan Watershed: A Case Study." This technical note describes the steps involved in developing an IBI and refinement of the technique to fit the needs of small watershed projects, typical of those receiving NRCS assistance. In addition, it explains how the IBI may be used to evaluate the combined effects of conservation measures, typical of those that are commonly used in planning resource management systems. The technique is in use by the Wetland Science Institute (WSI) in cooperation with NRCS Virginia to evaluate the effects of forested riparian buffers that are being installed in northern Virginia through the Conservation Reserve Enhancement Program (CREP).

Technical Note 190-13-1 is available at the WSI home page http://www.pwrc.usgs.gov/WLI under Wetland Products>Technical Notes.

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#3 New Video Highlights Private Landowners Role in Wildlife Habitat

"Our Living Land" is an 8-minute video that highlights the role of America's farmers and ranchers in providing wildlife habitat on private lands. This multimedia presentation is accompanied by a publication also called "Our Living Land." The program, with a message from Wildlife Habitat Management Institute (WHMI) Director Pete Heard, shows conservation efforts by farmers and ranchers in Oklahoma, Iowa, California,

Florida, New York, Michigan, Connecticut, Montana, the Pacific Northwest, and the lower Mississippi valley. Contributors to the project include the American Soybean Association in partnership with numerous commodity and conservation organizations, with technical assistance from NRCS.

Plans are to send the video and the publication on the road across America to help people understand the vital relationship between agriculture, wildlife, and fish resources on private lands. They were presented recently at the 67th North American Wildlife and Natural Resources Conference in Dallas and at the National AgriMarketing Association conference in Nashville. The American Soybean Association has scheduled a presentation for Capitol Hill sometime in June.

The booklet may be seen on the WHMI homepage http://www.ms.nrcs.usda.gov/whmi/ and copies can be obtained by calling 1-888-Landcare.

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TECHNOLOGICAL ADVANCES

#4 Window Pedon 1.0 Software Released

All software, training materials, and support team lists are complete and the Windows Pedon program is certified for release into the Common Computing Environment (CCE). Windows Pedon provides scientists with the ability to record soil profile descriptions in a standard, nationally supported system independent from the National Soil Information System (NASIS), but still consistent with NASIS and all other standards in the National Cooperative Soil Survey (NCSS). The system has broad application throughout the NCSS, private industry, and in educational settings.

Windows Pedon 1.0 runs in the Windows 95/98/NT/2000 environment and provides users with a mobile, independent system optimized for data entry of detailed soil profile descriptions. Terminology, data elements, and choice lists are consistent with NCSS standards for description and classification of soils. The current version of the software includes basic reports for printing narrative profile descriptions in a standard format. Data elements and data structure in Windows Pedon are essentially identical to those in NASIS 5.0, thus making data transfer from Windows Pedon into the NASIS possible.

Although this first release of Windows Pedon does not have the capability to export data directly to NASIS, current plans are to incorporate this capability into the next release of the software.

A software installation CD, which contains support documentation in MS Word and PDF format, is available from the National Soil Survey Center. The software installation file and supporting documentation files are available for download at http://nasis.nrcs.usda.gov/downloads/. This site has a link that allows you to subscribe to a list server for future announcements relating to the Windows Pedon program.

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TECHNOLOGY TRANSFER

#5 Microtopography Development Enhances Results in Wetland Reserve Program

Wetland microtopography workshops, sponsored by the Watersheds and Wetlands Division and Wetland Science Institute (WSI), were held in the Texarkana area in 2000 and 2001. The workshops stressed the importance of fully restoring wetland hydrology and constructing macro- and micro-topography in Wetland Reserve Program (WRP) projects. They provided information on "how to" create hydrologic diversity based on examples from California wetland restorations, where waterfowl habitat and other wetland functions had been significantly improved by de-leveling rice fields. The Texarkana region was chosen because some of the southwest Arkansas projects provide the best national examples of macro- and microtopographic development.

A follow-up visit was made recently to Arkansas, Louisiana, and Oklahoma for an informal group assessment of the progress in the construction of wetland restoration projects since the workshops were held. Staff from the WSI, as well as staff from each of the involved states, observed seven projects. In all cases considerable effort had been made by the states to create hydrologic diversity by constructing macro- and microtopographic features, such as mounds, depressional sloughs and swales, and meandering ridges. Although some projects had restored hydrology more fully than others, all had improvements significant to achieving hydrologic restoration. Perhaps even more importantly, the group observed unexpected numbers and kinds of land and water wildlife using the newly created features. It was apparent that the WRP projects were having a significant beneficial effect on wildlife populations in the area.

The Wildlife Habitat Management Institute (WHMI) is developing an agreement with the U.S. Fish and Wildlife Service (USFWS)-Partners for Fish and Wildlife and the University of Arkansas at Pine Bluff to evaluate water quality and fish and amphibian responses to microtopography development on WRP sites in the White River Watershed in Arkansas. The work will monitor the biological responses of the WRP sites developed under the guidance of the Arkansas WRP coordinator and develop technology to assist NRCS field staff with future WRP design and management. Staff from the WSI, the USFWS, and NRCS Arkansas and surrounding states will be involved in helping WHMI lead this process.

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WEB-BASED TECHNOLOGY

#6 International Collaboration Establishes the Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF) is an international mechanism designed to make biological data and information accessible worldwide to decisionmakers and the public. Nations around the world collaborated through the Convention on Biological Diversity to develop GBIF, which can be used for national economic, environmental, and social benefits. Users will be able to navigate the world's vast quantities of biodiversity information through an interoperable network of biodiversity databases and information technology tools.

NRCS PLANTS http://plants.usda.gov/ and the Integrated Taxonomic Information System http://www.itis.usda.gov/ will function within the GBIF network. Scott Peterson, National Plant Data Center Director, participated in a recent meeting in Australia of a GBIF subcommittee that is working on the Electronic Catalogue of Names of Known Organisms, also known as the Catalogue of Life.

Visit the GBIF Web site at http://www.gbif.org/.

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TRAINING

#7 NRCS Offering ESRI ArcGIS 8.1 Training

Building on the enterprise GIS agreement between the USDA and the Environmental Systems Research Institute, Inc. (ESRI), NRCS now has an ESRI Authorized Learning Center at the National Cartography and Geospatial Center (NCGC) with three ESRI authorized instructors. These instructors are available to teach the ESRI "Introduction to ArcGIS I (for ArcView 8, ArcEditor 8, and ArcInfo 8) " course.

The course is presented over 3 days, with the first 2 days introducing students to ArcGIS and providing the foundation for becoming a successful ArcView 8, ArcEditor 8, or ArcInfo 8 user. Participants learn how to use ArcMap, ArcCatalog, and ArcToolbox and explore how these applications work together to provide a complete GIS software solution. The course covers fundamental GIS concepts as well as how to create, edit, and work with georeferenced spatial data. Attendees learn how to manipulate tabular data, query a GIS database, and present data clearly and efficiently using maps and charts. The NCGC instructors have expanded on the ESRI ArcGIS Course with a third day of instruction that incorporates sections on the fundamentals on Global Positioning System (GPS) technology, ArcIMS (Internet Map Service), and ArcSDE (Spatial Data Engine) and other Agency-specific issues.

The training is offered at the NCGC GIS training room on 16 high-end GIS configuration CCE (Common Computing Environment) computers. Training at other sites can be scheduled provided adequate facilities and equipment are available.

For more information, please visit the web site at
http://www.ftw.nrcs.usda.gov/gistraining.

Or contact:

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#8 *The Leader in You* Highlights Effective Strategy in a Changing Landscape

The Social Sciences Institute (SSI) has two remaining training seminars in the spring 2002 ***The Leader in You*** series. SSI also has additional products and videotapes that deal with managing change and other topics in this series.

On Wednesday, June 12, from 11:00 a.m. to 12:30 p.m. e.t., "Strategy in the New Competitive Landscape," the final presentation in *The Leader in You* spring 2002 series, will provide a new view of strategy for achieving goals that focus on value creation and the influence of a changing competitive landscape. In the business of agriculture, for example, globalization and a broad range of new technology are some of the forces creating change. "We see in 2001 a highly diverse set of farms, responding with alacrity to apply unique technological possibilities to a new array of increasingly well articulated consumer demands in a globalized food system," according to the USDA's "Food and Agricultural Policy: Taking Stock for the New Century." (www.usda.gov/farmpolicy/farmpolicy.htm). The resource conservation challenges in this rapidly changing technological and economic environment will become increasingly complex; outsourcing and third party vendors will play a larger role in addressing them.

In the June broadcast, C.K. Prahalad, professor of Corporate Strategy and International Business at the University of Michigan Business School, will address the skills needed to continue to successfully compete in a new environment. The convergence of technology and industry is one contributor to a new dynamic that managers, including natural resource managers, must rapidly learn to understand. Dr. Prahalad will examine the contours of the new competitive environment, the changes in process by which managers can create value, the need for a rapid learning curve and an equally important quick "forgetting curve," the process of becoming opportunity driven, and the leadership demands on managers. Satellite broadcast information and handouts will be available by June 1.

The Leader in You satellite seminar, "Since Strangling STILL Isn't an Option: Managing Difficult People," will be broadcast on Tuesday, May 14, from 1:00 to 3:00 p.m. e.t. Stay alert to distribution of satellite broadcast coordinates and handout information in an all employee e-mail.

Tapes available on the topic of managing change from previous broadcasts in the ongoing *The Leader in You* training series are "The Secret of 'Real Change': Not What You Think," "Sacred Cows Make the Best Burgers," "Building Nimble Organizations for Turbulent Times," and others. In addition to *The Leader in You*, SSI offers a broad range of products that support the people aspects of conservation work, including technical reports, fact sheets, Web-based products, and other training courses. Products and the catalog are available at http://www.ssi.nrcs.usda.gov/ or print copies can be requested from ssinter2@po.nrcs.usda.gov.

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